Claims

1. A method of preparing porous alpha- or beta-tricalcium phosphate, brushite ($CaHPO_4 \cdot 2H_2O$), calcium pyrophosphate ($Ca_2P_2O_7$) or hydroxyapatite ($Ca_5(PO_4)_3(OH)$) or mixtures thereof in the form of morsels or granules comprising:

a) mixing a calcium phosphate self-setting cement powder and gelatin powder in a ratio effective to create subsequently formed pores;

b) adding a Na_2HPO_4 solution followed by mixing the formed paste;

c) placing the formed paste into a device ;

d) squeezing out the morsels from the device ;

e) placing the morsels, after removing them from the device in distilled water at a time and temperature effective to dissolve away the gelatin and to form interconnected pores;

f) thermally treating to burnout all organic or volatile material followed by successive cooling to room temperature; and

g) optionally crushing calcined, sintered morsels and then sieving to obtain porous granules.

2. A method according to claim 1, further comprising, after squeezing the morsels:

d_1) keeping dry the formed morsels at room temperature for about 2 days for further machining.

3. A method according to claim 1, wherein the mixing ratio is 3 : 0.7 - 3:-1.

4. A method according to claim 1, wherein the thermal treatment temperature is up to the sintering temperature of the respective calcium phosphate compound.

5. A method of preparing porous alpha- or beta-tricalcium phosphate, brushite ($CaHPO_4 \cdot 2H_2O$), calcium pyrophosphate ($Ca_2P_2O_7$) or mixtures thereof, comprising:

thermally treating a morsel made by mixing a calcium phosphate cement powder and a gelatin powder to a sintering temperature to burnout all organic or volatile material.

6. A method according to claim 5, wherein thermally treating the morsel is conducted at a temperature effective to burnout the morsel.

7. A method according to claim 6, wherein the effective temperature is at least 1200°C.

8. A method according to claim 1, further comprising after thermally treating, crushing calcined, sintered morsels and then sieving to obtain porous granules.

9. A method according to claim 1, wherein the calcium phosphate comprises α-TCP, β-TCP, $Ca_5(PO_4)_3(OH)$, dicalcium phosphate dihydrate, anhydrous dicalcium phosphate, or amorphous calcium phosphate.

10. A method according to claim 5, further comprising, before thermally treating, placing morsels in distilled water at a temperature and duration effective to form interconnected pores.

11. A method according to claim 10, wherein the temperature is 37°C and the duration is 2 days.

12. A method according to claim 1, wherein the pores have a size of 250-400 microns.

13. A method according to claim 1, wherein the cooling after thermal treating comprises quenching at a time and temperature effective to obtain a single-phase α-TCP.

14. A method according to claim 1, wherein the cooling after thermal treating comprises cooling at a time and temperature effective to create a single-phase β-TCP.

15. A method according to claim 13, wherein the cooling after the thermal treating comprises quenching from 1200°C to 1000°C in about 10 minutes to obtain a single-phase α-TCP.

16. A method according to claim 14, wherein the cooling after thermal treating comprises slowly cooling from 1200°C to 1000°C in about 1 hour to obtain a single-phase β-TCP.

17. A method according to claim 1, wherein the ratio of cement powder and gelatin powder is 3 : 0.25 - 3 : 1 and the time and temperature effective to dissolve away the gelatin and to form the interconnected pores are, 37°C and a few days.

18. A method according to claim 17, wherein the time is at least three days.

19. A method of preparing a porous calcium phosphate material of alpha- or beta-tricalcium phosphate, brushite ($CaHPO_4 \cdot 2H_2O$), calcium pyrophosphate ($Ca_2P_2O_7$) or hydroxyapatite ($Ca_5(PO_4)_3(OH)$) or mixtures thereof, comprising:

shaping a mixture of a calcium phosphate cement powder and gelatin powder in a ratio of 3 : 0.25 – 3 : 1;

soaking a shaped mixture in a solvent at a time and temperature effective to leach out the gelatin and form interconnected pores; and

thermally treating the shaped mixture at a temperature effective to burnout any organic or volatile material.